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## CAUSES AFFECTING RAILWAY RATES AND FARES.

The most superficial study of railroad conditions will reveal a fundamental difference between the freight and the passenger policy of railroads. There has been no more distinctive feature of modern industrial progress than the rapid decline in freight rates and the consequent vast increase in freight traffic. Each decade has seen a considerable diminution in the charges for the transportation of goods, and every technical advance, the invention of the steel rail, the construction of heavier locomotives, etc., has contributed to this result. This reduction, moreover, which has been common to practically all railroads and all countries, shows no signs of immediate cessation.

In the passenger traffic, another and a different development has taken place. The passenger fares were originally based upon the table of charges of the old stage coaches, and the maximum charges prescribed contemplated a toll for the use of the road and a separate charge for that of the new kind of vehicle. The analogy between the railroad and its predecessor in the passenger traffic was not only formal but material. The maximum fares were little below the charges on the more primitive coaches, and unlike the freight charges, they have, until recently, shown no marked tendency to decline rapidly, but have rather manifested a reluctance to depart very far from the highest rates permitted. This distinction, however, may not be carried too far. It is false to state (as has been done) that passenger fares have not been reduced at all, but it is equally certain that they have declined to a far less extent than have freight rates.

There are no limits to the evidence that could be cited in substantiation of this statement, except those set by the length of this paper, but a few examples will suffice. From 1844 to 1879, the freight rates on Prussian railways decreased

79 per cent, and the passenger fares but 19 per cent.\* The following table shows the comparatively slow decline of the passenger fares:

Year.	Rate per ton-mile. Cents.	Fare per passen- ger-mile. Cents.	Rate per ton-mile in per cent of fare per passenger-mile. Per cent.
1844 . . . . .	5.82	1.78	327
1850 . . . . .	3.69	1.79	206
1860 . . . . .	2.84	1.65	172
1869 . . . . .	2.00	1.41	143
1879 . . . . .	1.68	1.34	126
1895† . . . . .	1.44	1.10	131

Thus until recently the decline in the freight rates was considerably more rapid than that of the passenger fares. A similar decline is noticeable in France.‡

Year.	Rate per ton-mile. Cents.	Fare per passen- ger-mile. Cents.	Rate per ton-mile in per cent of fare per passenger-mile. Per cent.
1831 . . . . .	4.98	2.41	207
1841 . . . . .	3.73	2.18	171
1851 . . . . .	3.02	2.15	140
1855 . . . . .	2.38	1.84	129
1867 . . . . .	1.90	1.64	116
1877 . . . . .	1.85	1.61	115
1894 . . . . .	1.62	1.22	133

In the United States, the fare per passenger-mile is greater than the rate per ton-mile, but the same development is observable. The following table has been taken from the statistics in Poor's "Manual" (1897):

\* These figures are taken from Ulrich, "*Das Eisenbahntarifwesen*," p. 161.

† As may be seen from the above, and from the analogous table for French roads, there has been a recent tendency for the passenger fares to decline somewhat more rapidly than hitherto, and in many cases the recent decline has been greater than that of freight rates. There is a fundamental similarity, however, in the development in all the countries cited.

‡ These figures have been calculated up to 1877 from the data furnished by de Foville, in: "*La transformation des moyens de transport*."

Year.	Rate per ton-mile. Cents.	Fare per passen- ger-mile. Cents.	Rate per ton-mile in per cent of fare per passenger-mile. Per cent.
1884 . . . . .	1.124	2.356	48
1887 . . . . .	1.034	2.276	46
1890 . . . . .	.927	2.174	43
1893 . . . . .	.893	2.072	43
1896 . . . . .	.821	2.034	40

This development, moreover, has been of no recent date. In Massachusetts, where traffic conditions most nearly correspond to those of Western Europe, the development has been as follows:

Year.	Rate per ton-mile. Cents.	Fare per passen- ger-mile. Cents.	Ratio of rate to fare. Percentage.
1865 . . . . .	4.16	2.59	160
1871 . . . . .	3.11	2.51	124
1875 . . . . .	2.45	2.30	106
1880 . . . . .	1.84	2.05	90
1885 . . . . .	1.59	1.88	85
1890 . . . . .	1.45	1.82	80
1895 . . . . .	1.28	1.78	72

These data apply to the Boston and Albany, Boston and Maine, Fitchburg, and New York, New Haven and Hartford Railways for 1865, and for all Massachusetts roads for the remaining years.\* Finally, the same phenomenon may be observed for three decades on the Pennsylvania Railroad.†

Year.	Rate per ton-mile. Cents.	Fare per passen- ger-mile. Cents.	Ratio of rate to fare. Percentage.
1865 . . . . .	2.715	2.748	97
1870 . . . . .	1.503	2.568	59
1875 . . . . .	1.126	2.573	44
1880 . . . . .	.918	2.222	41
1885 . . . . .	.695	1.950	36
1890 . . . . .	.655	2.077	32
1895 . . . . .	.563	1.953	29

\* Twenty-seventh Annual Report of the Board of Railroad Commissioners of the Commonwealth of Massachusetts. Boston, 1896.

† Forty-ninth Annual Report of the Pennsylvania Railroad. Philadelphia, 1896.

Accompanying this decrease in rates there has been a wonderful increase in the freight traffic, an increase which dwarfs by comparison the slower development of the passenger traffic. The following tables give an idea of the nature of this development in Prussia:

Year.	Freight Transportation.		Freight receipts, per mile of road.
	Number of tons transported.	Ton-miles, per mile of line.	
1844 . . . . .	392,251	31,071	\$1562
1850 . . . . .	2,255,590	66,106	2517
1860 . . . . .	14,788,641	170,705	5079
1869 . . . . .	51,252,623	368,056	7621
1879 . . . . .	105,114,161	439,337	7554

The development of the passenger traffic was as follows:

Year.	Number of pas- sengers carried.	Passenger-miles, per mile of road.	Passenger receipts, per mile of road.
1844 . . . . .	3,940,904	192,077	\$3108
1850 . . . . .	9,241,780	146,324	2582
1860 . . . . .	21,641,083	160,141	2746
1869 . . . . .	61,949,816	221,169	3227
1879 . . . . .	114,402,292	196,843	2736

The significance of this development can not be overlooked. While the number of passengers increased twenty-nine-fold from 1844 to 1879, the number of tons transported increased 268-fold within the same period; while the passenger density (the number of passenger miles per mile of road remained constant, the freight density increased fourteen-fold; while the passenger receipts per mile of line were about ten per cent lower in 1879, the freight receipts, despite the enormous decrease in rates) were almost five times as great per mile of line as they were in

1844.\* The increasing preponderance of freight traffic and of freight receipts may also be seen in the case of the French railways of general interest (*d' intérêt général*), where from 1855 to 1884 the number of passengers increased 543 per cent, and the number of tons 655 per cent, while the passenger density decreased from 361,691 to 239,632, and the freight density increased from 301,155 to 364,818.† From 1884 to 1896, the number of passengers on American railroads increased 60 per cent, the tonnage transported 83 per cent, and while the freight density increased from 395,158 to 519,007, the passenger density declined from 77,565 to 72,116.‡ During the last thirty years the railroads east of Pittsburg and Erie operated by the Pennsylvania Railroad showed an increase of 937 per cent in the number of passengers, but of 2411 per cent in the number of tons carried; an increase of 208 per cent in the passenger mileage, but of 1703 per cent in the freight mileage; while despite the immense decrease in freight rates, the passenger receipts increased but 118 per cent, and the freight receipts 274 per cent.§ Innumerable examples might be cited tending to prove the truth of the statement that freight rates have diminished far more rapidly than passenger fares, and that freight traffic has increased with far greater rapidity than the passenger traffic, and in consequence, is obtaining a greater and greater preponderance in the whole traffic.

It is less with the phenomenon itself, however, than with

\* From 1879 to 1896-97, however, the reduction in the passenger fares (mentioned in a former note) has caused a remarkable increase in the passenger traffic. During the last seventeen years the increase has been as follows:

	1879.	1896-97.	Per cent of increase.
Number of passengers . . . . .	114,402,292	436,609,672	282
Number of tons of freight . . . . .	105,114,161	167,264,316	64
Receipts per mile of road:			
From passenger traffic . . . . .	\$2,736	\$4,059	48
From freight traffic . . . . .	7,554	10,113	34

† See Alfred Picard, "*Traité des Chemins de fer.*" Paris, 1887. Statistical tables in Vol. iv.

‡ Computed from Poor's "Manual," 1897.

§ Computed from Pennsylvania Railroad Report.

its cause, that we are concerned, and in this paper I shall merely attempt to explain in a general way the causes that have operated to produce the discrepancy between freight rates and passenger fares, and the peculiar factors that have accentuated this discrepancy in our own country. It will be found, that while the evolution of rates that we have observed is partly attributable to a conscious policy on the side of the railroads, it is due in still greater measure to the natural conditions of railroad transportation. Before proceeding further, therefore, we must rapidly review the laws by which railway rates are regulated.

About the time of the inception of the railroad, it was generally supposed that the competition of several carriers upon a common road would effectually regulate and considerably reduce both freight rates and passenger fares. When this competitive bidding failed to take place, it was still supposed that, while rates might not be regulated for intermediate stations, the competition of the railroads at their points of intersection would assure the benefits of low rates and fares for the great bulk of the traffic.\* However, even this hope proved illusory; the effect of the struggle of competing railways for the same traffic was not permanently to cheapen but rather to equalize the rates upon the several lines. It is one of the peculiarities of a railroad that it can better afford to take traffic at a rate, which, if universal, would ruin it absolutely, than not to take it at all, and in the virulent rate wars of earlier decades, the charges often fell even below this point. A second peculiarity of a railroad is that it never knows when it is beaten. To it a bankruptcy means at the most a mere change of management, and an enhancement, rather than a diminution, of its power to injure a rival. By competition the railroads certainly injure each other, but as the damage to the second

\*The classical presentation and criticism of the successive theories of the competition of railways are to be found in Sax's admirable treatise "*Die Verkehrsmittel in Volks- und Staatswirtschaft*." Vienna, 1878.

road does not usually place it *hors de combat*, such mutually inflicted injuries bring no corresponding benefit. By dint of hard experience, therefore, the railways have discerned the wisdom of a more peaceful policy. In some instances, hitherto competing roads amalgamate, or enter into a traffic arrangement, by which either the traffic itself or the receipts therefrom are divided; in other cases, a definite, common rate is made, which sets a limit to the competition. In the latter cases, the competition may become one of service, or oftener still, simply one of comparative outlay on advertising, and soliciting agents, a regrettable tendency to be observed in many fields of economic life, far removed from the railways.

Had the competition of railroads among themselves succeeded in reducing freight rates, there would have been no sufficient reason why the same cause should not have led to a similar result in the case of the passenger traffic. It was not, however, the competition of neighboring railways, but rather that of railways at a distance, of canals, and of the great sea itself that set a limit to railway charges, and these influences have been far more potent in the case of the freight, than in that of the passenger traffic.

Until recently, the railroads enjoyed a practical monopoly of the bulk of the passenger traffic. Travel by train was always cheaper, safer, speedier and more comfortable than by coach, or other land conveyance, and for all longer distances the element of time played so vital a part, that walking became dearer than riding.\* With the exception of urban traffic, which was largely effected by cars propelled by animal or mechanical power, the steam railway enjoyed, until the advent of the bicycle and the electric railway, a practical monopoly of the passenger business. In the

\* Perhaps we fail to fully realize the amount of long-distance traveling that is effected by mere walking. In undeveloped countries, where wages are very low and fares high, the main instrument of travel may be the human leg, and Hertzka ("Das Personenporto." Vienna, 1885), assures us that until recently much of the movement of the population of Austrian villages took place in this manner.



freight traffic, however, the conditions are very different. With the great bulk of the traffic, change of place is the sole desideratum, and while water carriage is slower, it is so cheap, especially upon the sea and the navigable rivers, that it absorbs a large proportion of the traffic and affects the rates of the remainder. The story of the struggle between the railway and the canal is one of the most interesting in the domain of economic history, but what we are here especially interested in is the fall in freight rates which enabled the railroads to compete. In Germany, in France, in the United States, in all countries, in fact, where the one agent of transportation has not, as in Great Britain, fallen under the control of the other, the result has been that the canal has not only set maximum rates for the railroads (maxima far more effective than those set by legal or constitutional enactment), but has stimulated the railroads to improve their service and to economize expenses, which in their turn have rendered future reductions in rates possible.

Freight rates have also been lowered through the competition of railroads, or other transportation agents, situated hundreds or thousands of miles from each other. It is regrettable that the problem of railway competition has been studied too locally, and with insufficient emphasis upon its national and international bearings. Strictly speaking, permanent competition can exist, not between railways struggling for the same traffic, but solely between those railways which have no territory in common. Given two railways which tap a given, circumscribed wheat area in Dakota, and however bitter and fierce the struggle for patronage may temporarily be, the inevitable result is the adoption of a *modus vivendi*, which places rates upon a permanent basis. But Dakota wheat enjoys no monopoly, and the freight rates on these roads must be low enough to allow the Dakota farmer to compete with the farmers of Nebraska or Kansas. In consequence the freight charges on Kansas and Nebraska

roads will determine a maximum above which the Dakota railroads can not permanently charge. The same fact is true of foreign competition. Our wheat roads must compete not only with those of Canada, but with Indian, Russian and Argentinian railways, as well as with numerous maritime agencies all over the world.

The reality of this competition is seen by the fact that the railroad, together with its customers, may be driven out of the business and abandoned. The fact cannot be too strongly emphasized that the interest of the railroad is in general bound up with that of its district or territory, and it is equally true that in the majority of cases, the railroads realize this dependence. It is to the interest of the railroad to be guided immediately by the competition of transportation agents in other districts and other countries, and not to ruin its own district for the sake of temporary gain. The company that kills the goose that lays the golden egg is bound to feel the injurious effect of this short-sighted policy, and however difficult of demarcation may be the line between "what the traffic will bear" and what the traffic will not permanently bear, such a line undoubtedly exists.

It does not follow from what has just been said that the competition of separate districts, and in consequence of their railways, will cure or prevent all railway ills, or that it should insure the railways from all forms of governmental interference. This competition will not prevent the railway from indulging in the grossest discrimination or from effecting thereby the most revolutionary redistribution of wealth within its district, but it will at all events keep down freight rates and induce the railroads to make, if necessary, repeated concessions to the needs of their patrons. This competition, however, which varies in effectiveness with the extent of the market, is practically non-existent in the transportation of passengers. The freight charge for Dakota wheat will be affected by the wheat rates on Indian railways; the charge on cotton cloth made by New England roads will be

influenced by similar charges on certain Southern railways, and the milk rates from a Pennsylvania county to Philadelphia will vary with variations in the milk rates on another road from an adjacent county to the same city. The competition will be more effective if the market is national than if it is local, and more effective still for a world-market than for a national market. But it is a matter of supreme indifference to the railroad whether the Pennsylvanian pays a higher fare than the Rhode Islander, Virginian, or New Yorker, or a higher or lower fare than the Belgian, German, or Russian. There is no competition, and therefore the fares in one country have no necessary connection with those in another country.

We have seen that in the transportation of staples, and, in fact, of nearly all freight, the competition of railroads in districts competing for the same market tends to reduce rates. But apart from this competition, be it domestic or foreign, there are other factors which tend to a reduction of rates. It is a natural and inevitable tendency for the railroads to stimulate traffic to the utmost possible limit. This is due to the nature of the railroad. With it not only does the appetite grow with what it feeds on, but the ability to swallow and digest likewise. The cost of transporting a ton of any given freight will decrease with every additional ton transported. It costs less per ton to transport twenty million than to transport ten million tons per year, and it is by no means necessary to charge twice as much for the greater as for the smaller quantity. To carry cheaply, the railroad must carry much, and it may be good policy to obtain a large traffic and therefore low cost (to the railroad) of transportation even at the expense of reduced freight rates.

In order better to appreciate this tendency, it may be well to discuss at some length the law of costs in railroad transportation. The railroad business is essentially an industry of increasing returns, or to express the same thing differently, of decreasing costs. Not all the expenses of the railroad

increase proportionately with the traffic, and some of them are entirely unaffected by any addition thereto. Let us consider, for instance, the item of interest upon capital cost.\* Before we have railroad traffic, we must have the railroad. The right of way must be purchased, or otherwise obtained, the permanent way constructed, tracks laid, workshops built, stations erected and furnished, engines and cars acquired, etc. The interest upon the sums thus invested is a fixed charge, and is not in the least affected by the amount of the receipts or the magnitude of the traffic. It is therefore evident that even though the cost of maintenance of way and equipment, of conducting transportation and of general administration, in short, even though the total operating expenses of the road should increase proportionately with every increase in the traffic, any addition to the traffic would still result in a lessening of the total cost per passenger or per ton-mile. For even though the operating expenses all kept pace with the increased traffic, and amounted, let us say, to five mills per ton per mile whether the traffic were fifty or one hundred million ton-miles, it would nevertheless be a gain to the railroad to have its fixed interest charges spread over the receipts of the larger rather than over those of the smaller traffic. But the operating expenses, themselves,

\* In American reports, we have two items specified: fixed charges and interest on capital. The first of these represents the interest on all debts and outstanding liabilities, whatsoever; the second the interest on the share capital. The reports seem to classify the first as a cost and the second as a profit, and from the standpoint of the shareholders this is undoubtedly correct. In point of fact, however, both bonds and stock represent the capital of the railroad, and the returns on both, the interest upon that capital. In my use of the word interest on capital cost, therefore, I refer neither to the first nor to the second item exclusively, and in fact to their sum only in so far as it represents the *actual* expenditure in constructing and equipping the road. The owners of the road usually consider the interest upon their investment as a profit, and as the sum once invested can not be withdrawn, and as the railroad can maintain itself without paying a cent upon this capital, the interest thus paid has at first sight the appearance of a surplus or profit. If, however, the return upon the capital invested falls below the current rate of interest, the investment is considered a poor or unprofitable one, and from the standpoint of the community, the interest at the current rate upon the total cost of constructing and equipping the road should be considered as a cost, which must be met just as the cost of fuel or of labor must be defrayed.

do not increase proportionately with the traffic. To double the traffic by no means signifies a doubling of the cost of maintenance of way; the number of trackmen is not increased in proportion, the cost of repairing bridges and culverts is hardly increased and the additional wear and tear upon rails and ties is scarcely appreciable. It does not require twice as many clerks in the general office to check twice the traffic, and the cost of administration increases indeed, but increases far less rapidly than does the traffic. Even the cost of "conducting transportation" decreases proportionately with an increase of the traffic. This decrease is perhaps not so marked as in the other items of expenses, and depends largely upon whether the increased traffic admits of an improved utilization of motive power and of rolling material, but even here, the total cost increases considerably more slowly than the traffic.

Without entering into a more detailed account of the effect of an increased traffic upon operating expenses, it may be said that there are some items of expenditure which increase proportionately, some that increase less than proportionately and others that are totally unaffected by an increase of the traffic. While there are peculiar circumstances, therefore, where an addition to the traffic might necessitate a more than proportional increase of the expense (as where a second track would have to be laid, or night service introduced), the almost universal rule is that with every increase in the traffic, there will be a corresponding, though not proportional, decrease of the cost per unit of traffic. Numerous calculations have been made tending to show the proportion that the increase of the cost bears to the increase of the traffic, or, the proportion of constant to variable costs in the operating expenses. It is not necessary to compare here the varying results of such investigations, especially as these results must inevitably be affected by the existing density of the traffic and by local conditions, but it may be noted that according to a somewhat general working hypothesis, it is

assumed that half of the total cost of railroading is made up of fixed charges on capital, and of the operating expenses one-half are fixed and one-half are variable. In other words only one-fourth of the cost to the railroad of operating its traffic and of paying the usual rate of interest upon its capital cost, only one-fourth of this total cost, below which the receipts dare not fall if the road is to be profitable, increases proportionately with an increase in the traffic. If we assume (and in the absence of exact figures it can be only an assumption)\* that but 25 per cent of the total expenses of the railroad will increase with an increase of traffic, we can obtain some conception of the force that stimulates the railroads to seek new traffic even at the cost of a diminution in the rates.

Let us assume for example, that upon a given railroad, a traffic of 300,000 tons per mile of road can be handled at a rate of 10 mills per ton per mile, so as to cover operating expenses of 5 mills per ton-mile, and to leave 5 mills to give the usual rate of interest (let us say 4 per cent) upon the actual capital invested. If then on our hypothesis the traffic were doubled, each ton could be profitably moved a mile for  $6\frac{1}{4}$  mills, since the operating expenses would decline to  $3\frac{3}{4}$  mills ( $\frac{5 \text{ mills} + 50\%}{1. + 100\%}$  or  $\frac{7.5 \text{ mills}}{2}$ ) while the cost per ton-mile required to meet the interests or capital would be reduced to  $2\frac{1}{2}$  mills ( $\frac{5 \text{ mills}}{2}$ ). The following table shows the rate at which the continually increasing traffic could, on our hypothesis, be handled with a constant profit of 4 per cent upon the capital:

\*It is deeply to be regretted that no calculations have been made upon fixed and variable costs on American roads, such as Nördling, Launhardt and a host of others have computed for German, French and Austrian railroads. Such a calculation for a typical eastern road, like the Pennsylvania, would be invaluable.

Freight Density.* Tons.	Charge per ton- mile required to cover operating expenses. Mills.	Charge per ton- mile required to pay 4 per cent upon capital. Mills.	Rate at which freight could be handled at 4 per cent profit. Mills.
300,000 . . . . .	5.00	5.00	10.00
600,000 . . . . .	3.75	2.50	6.25
900,000 . . . . .	3.33	1.67	5.00
1,200,000 . . . . .	3.13	1.25	4.38
1,500,000 . . . . .	3.00	1.00	4.00
1,800,000 . . . . .	2.92	0.83	3.75
2,100,000 . . . . .	2.86	0.72	3.58
2,400,000 . . . . .	2.81	0.63	3.44
2,700,000 . . . . .	2.78	0.56	3.33
3,000,000 . . . . .	2.75	0.50	3.25

It is naturally to the interest of the railroad to increase its net receipts as much as possible, and an increase or decrease of traffic is thus immaterial, provided the net receipts remain uniform. It is a matter of indifference to the railroad, in the above table, whether it carries 300,000 tons at 10 mills, 600,000 at 6.25 mills, or 1,200,000 at 4.16 mills, since, while the gross receipts increase, the net receipts remain constant. If, however, the railroad could obtain 600,000 tons at 6.75 mills or even 6.50 mills (instead of 6.25 mills), it would be to its advantage to reduce its rates from 10 mills to that point in order to obtain the increased traffic and increased net receipts.

What is it, then, that puts a limit to the continued decrease of rates and to the corresponding increase of traffic, and where do these limits appear in the freight, and where in the passenger, traffic? In answer, it may be said that the railroad traffic of any district is limited, in the first place, by the productivity of that district. However low the rates, no more coal can be carried from the anthracite regions of Pennsylvania than can be obtained from their mines, and no more wheat from the West than can be grown in that

\* Freight density is a term applied to the result obtained by dividing ton-mileage by mileage of line. It thus represents the average amount of freight carried over the whole road. For the sake of simplicity we have considered freight instead of traffic density, which would have included both freight and passenger density.

district, and while the freight traffic consists also of what is imported into the district, the necessary balance between exports and imports will render them both dependent upon the productivity of the region. It is perfectly evident, therefore, that a traffic which is possible in one district is quite unattainable in another, and that a rate may be reasonable or even high in one part and ruinously low in another part of the same country.

There are, moreover, other checks to the indefinite growth of the traffic. The indefinite expansion of railway traffic would readily bring it to a point where the hypothesis that we have made would no longer cover the facts. In every railroad there is a point of maximum intensity, beyond which traffic cannot increase without an increased expenditure of capital upon the road. The maximum density of traffic of a single-track road is attained when the increase of traffic necessitates the laying of a second track, or the construction of enlarged stations, or the acquisition of other facilities. There is, of course, no *absolute* maximum of intensity, since theoretically, at least, the railroad can increase its capacity for traffic indefinitely, but for any given expenditure of capital upon a road there is a maximum of traffic, of which the road is capable, and when this maximum is reached, a further increase of business can be dispatched, only after increasing the capital, and therefore the interest charges upon the road. But the increased charges thus occasioned; while they do not stop, have at least the effect of slackening, the decline in the cost of handling additional quantities of freight or additional numbers of passengers.

Finally, a third influence, which lays an effective check upon the indefinite expansion of the traffic, is the continual diminution of the incentive to an increased use of the railroad. As the larger the traffic, the lower the cost of handling it, so the lower the charges, the larger the traffic; to reduce freight rates means to increase freight traffic; to reduce fares, to increase passenger traffic; and the corollary



to this is, that the greater the reduction the greater the increase, and the smaller the reduction the smaller the increase in traffic. In the case above mentioned it would pay the railroads to reduce their freight rates as much as  $3\frac{3}{4}$  mills (from 10 to  $6\frac{1}{4}$  mills), if, as is quite possible, this immense reduction would lead to an increase of from 300,000 to 600,000 tons, to an offering, in other words, of an additional 300,000 tons for transportation. But to secure still another 300,000 tons (from 600,000 to 900,000 tons), the railroad could afford to make a reduction no longer of 3.75 mills, but merely of a fraction over one mill ( $1\frac{1}{4}$  mills,  $6\frac{1}{4}-5$ ), and after a certain low rate had been reached, any further reduction of rates would not succeed in attracting the amount of additional traffic, that alone could render it profitable. At this point, it would be a mistaken policy further to reduce rates.

The comparative cheapness of passenger and of freight rates will thus depend, in no small measure, upon which of the two the point is sooner reached, where the traffic will fail to respond sufficiently to a reduction in rates to render such reduction profitable. This capacity for stimulation will naturally vary with differences in the density of traffic, the smallness of existing rates, etc., and will be dependent upon a mass of local and particular conditions, but there will nevertheless be found a fundamental difference underlying the susceptibility of freight and that of passenger traffic to such stimulation.

We have not here to deal with the question whether men or commodities possess the greater mobility. The comparison of the mobility of self-directing objects with that of inanimate objects not possessing that power is one that may be suspected of barrenness. It must be admitted, however, that the mobility of commodities, of freight in short, is affected to a far greater degree by variations in the cost of carriage than is that of persons. Business is a matter of calculation and not of sentiment, and it is dollars and cents alone that determine whether wheat shall be sent to

Liverpool or held in Chicago. But a turn of a coin by no means determines whether an individual shall travel from New York to Boston or to Philadelphia. In the case of the freight shipment, the question is simply whether or not the value of the wheat on its arrival at Liverpool will exceed its value at Chicago by more than the amount of the freight, and in such a case a penny turns the scale. The amount of the railway fare, however, is but one of many items, and sometimes but an inconsiderable factor in determining whether a trip shall be taken, just as the cost of the stamp is not always the main consideration in deciding whether or not a letter shall be written. Against the anticipated pleasure, profit or benefit of the railway journey, the prospective traveler weighs not only the cost of the ticket, but also the loss of time, the discomfort (if not the danger) of traveling, the pecuniary or other loss involved in an absence from home, the cost of living in another place, etc. The greater the number and the stronger the influence of these motives, the smaller will be the influence of fares, the less effect will a reduction of passenger fares have upon the amount of the passenger traffic, and the higher will be the rate, below which a reduction in fares will cease to attract a sufficiently increased traffic to render it profitable to the railroad.\* For this reason, however, the freight traffic, in which no other motives operate and in which the transportation charges exert a preponderating influence, will respond more fully and much longer to rate reductions, than will the passenger traffic.

\* It is obvious that, in some forms of passenger traffic, the cost of the ticket is of relatively more importance than in other branches of the business, and, it seems to me, that the reduction of fares for round trips must be justified on this ground. There seems no reason at first glance why one should pay more for a trip of two hundred miles than for the two trips of one hundred miles each, or why it should cost less, if the traveler returns within three days instead of within three weeks. The short time limit evidently allows a somewhat better use of the cars (as the time of return may be better calculated), but the chief justification of the reduction for short-time return tickets seems to be in the fact that in this traffic the railway fare makes up a large part of the total expense, and the traffic is therefore more amenable to stimulation through reductions in fares.

It has been assumed in the foregoing that the railways will always be in a position to appreciate their interests and to realize them, and that a reduction of rates will inevitably take place, whenever it is warranted by the economic conditions. The hypothesis assumes the influence of railway rates upon the volume of traffic, and that of volume of traffic upon cost of operation to be readily determinable and that the railways will be sufficiently guided by an enlightened self-interest to gladly lower rates. In actual practice, however, the trend of charges to a low, but profitable level, is less certain and far less direct than has been assumed, and in this fact is to be found still another cause for the prevalence of high passenger fares.

In practice, rate reductions are usually made not as a part of a desirable policy but as an unavoidable exception to such a policy; they are regarded as special, not general; as concessions or favors, not as profitable ventures. A diminution of freight rates is usually made not permanently and along the whole line, but in the form of a series of reductions, justified by peculiar conditions of time or place, of character or amount of shipment, and in the course of time a schedule of rates thus tends to become a series of exceptions to a general, but obsolete tariff. Reductions, arising thus less from the will and at the instance of the railroads than from the pressure of their patrons, will naturally be more common in the freight than in the passenger traffic, since the pressure that the shippers of freight can bring to bear upon the railroad is far greater than that which any combination of passengers is likely to exert. The magnitude of the freight operations of a single firm may enable it to obtain especially favorable terms. In freight transportation the interests involved are sufficiently large to reward the intelligent consideration and study of the shipper or manufacturer, and in a question which may be a matter of economic life or death to him, the consignor of freight is not apt to be over-nice in the use of any means that may influence the

determination. This influence, moreover, is greatly intensified in the case of large associations of shippers or manufacturers, especially where the organization, which represents the common interests of its members, is sufficiently rich and powerful to dictate rates. Even where the competition of district with district does not reduce railroad rates to a point incompatible with profit, an aggregation of shippers may not infrequently bring down rates to the same or to a still lower level. The history of the Standard Oil Company affords an instance of the power even of a single company to obtain the same result.

The passenger, however, can impose no such conditions upon the railroad. The great number of separate agreements or purchases (of tickets) into which the passenger traffic is divided, robs any single transaction of great importance. Compared to the freight traffic, the passenger business presents a series of small purchases,\* and the traveler finds himself in a position analogous to the buyer from a retail store, where the smallness of the outlay and the inertia of the purchaser tend to produce a monopoly price. The passenger suffers the added disadvantage of being obliged to buy his transportation at once. A trip which may be worth five times the amount of the fare to-day will be useless, and worthless, to-morrow or next week, and the prospective traveler is thus situated similarly to the workman, who must sell his labor immediately, or not at all. Unlike the latter, moreover, the passenger who regards traveling merely as an incidental activity is usually unable or unwilling to combine, and the great unorganized mass of travelers is capable of presenting but little resistance to an increase, and still less pressure upon the railroads for a reduction, of the

\*The average fare paid upon American railroads is only 49.6 cents per trip (1896): on British (1894), 14.9 cents; on German (1894-95), 16.8 cents; on Belgian (State, 1896), 19.9 cents, and on French railways (1894), 22.1 cents, etc. This fare is somewhat lower, however, than the average amount of all payments for passenger transportation, since return tickets are counted as two trips, although paid for at once, and season-tickets are treated similarly.

fares. In countries where the railways are owned, or their policy controlled by the state, the passenger may accomplish by political activity what he is unable to effect as an economic agent. Thus, for example, the passenger reform in France on April 1, 1892, affords an instance of a scaling down of fares at the instance of the government, which would not have been remunerative or judicious under other circumstances. The school fare (including the passenger duty) declined 21 per cent from 1890 to 1895, and as the amount of travel increased only 34 per cent, the gross passenger receipts increased only one per cent ( $1.34 \times .79 = 1.06$ ), and the net passenger receipts actually declined, unless, which is quite improbable, the additional traffic was handled at the rate of three mills per passenger mile. The loss involved, however, has been chiefly, if not exclusively, incurred by the state, about half of the reduction in fares being due to the remission of the additional passenger duty (*l'impôt additionnel*). The sequel proved, however, that the reduction was not to the interest of the railways, and would not have been made at their cost and on their initiative. In countries, therefore, where the state either owns the railways or exerts an effective control over their tariffs, reductions in passenger fares are apt to be more frequent and more thoroughgoing.\*

In view of the natural inertia of railroad charges, it is not impossible, in the absence of sufficient compelling force on the part of the travelers, that passenger fares in many places have not yet been reduced to the level, at which they would insure the railroads the maximum revenue. † The question,

\*See the reductions in fares in Hungary, in Austria, in Russia, and more recently still in Denmark; see, also, former repeated reductions in Belgium and the above decline in fares on French railways.

† To those who suggest that a reduction of fares might be to the interest of the railroads themselves, is usually given the answer, that the railways are the best judges of their own interests, and are sure to do what it is to their own advantage. Even though the railways were omniscient, however, their competition with one another, or their liability to being preyed upon by outsiders (ticket-brokers, etc.), might easily prevent them from introducing reforms, or conditions might involve the pioneer of such a reform in disaster even though the reform itself were

however, is too complex, and its treatment necessarily too detailed to permit of consideration within the limits of this paper.

The actual discrepancy in the cost of hauling freight and of carrying passengers is most clearly perceived when we measure them both according to weight. If we compare the various railways of Europe and America, we will find that the railways receive from seven to thirty times as much for carrying a passenger a mile as for transporting an equal weight of freight (about 150 pounds) an equal distance. The increased charges for the transportation of passengers, however, are, at least in great part, due to the increased cost of the service. The carriage of persons is a far more complicated and far more expensive operation than is that of freight. It is undoubtedly true that in the passenger traffic, the railroads save the cost of loading and unloading, but even this economy disappears before the large number of additional expenses necessitated by the higher-classed passenger service. The demand of the traveler for safety, speed and comfort involves the railroad in many outlays. Passengers may not be piled up upon one another like bales of cloth or bundles of hay; they may not be left exposed to the wind or the rain; they dare not be left waiting for hours at stations, or upon sidings, nor may they be transported, without reference to schedule, at the convenience and good time of the railways. On the contrary, the railroads must provide a large number of costly arrangements in order that the traveler may be furnished with ordinary comforts. Spacious passenger stations must be erected on expensive sites, passenger carriages must be fitted up comfortably, if not luxuriously, a sufficient train *personnel* must be provided, ultimately beneficial. But it must not be straightway assumed that the railroad, or any body or corporation else, can always be sure of the consequences of a proposed policy. The same argument might have applied to the English postal officials, before penny postage was forced upon them by Rowland Hill. The introduction of the penny postage was not, it is true, immediately remunerative but its probable effect, as anticipated by the post-office, was far wider of the mark than were the results of Mr. Hill's calculations.

sanitary arrangements made, a costly system of signaling and safety appliances introduced, and the trains must run regularly, punctually and rapidly, whether their cars be filled or empty. When we reflect that, owing to the last consideration, the Saxon railroads are compelled to haul 14.36 tons of dead weight for every ton of human freight ( $13\frac{1}{3}$  passengers), that the proportion of dead weight, in other words, is 93.49 per cent, we may obtain some idea of the additional costs involved in providing accommodations for the passenger.\* The proportion of dead weight for all German railways was 93.75 per cent in 1896-97.

Without entering into a more special discussion of the additional costs in the passenger traffic, we may sum up their general tendency in the effect they have of decreasing the receipts per passenger train mile, and in increasing dead weight of trains. The statistics furnished by the Saxon reports show that the proportion of paying weight in the passenger traffic has diminished from 7.59 per cent to 6.51 per cent from 1880 to 1893, a total diminution of over 14 per cent, while from 1878 to 1895 the average weight carried per freight car axle increased from 1.657 to 2.138 metric tons. The proportion of seats occupied to seats empty is nowhere very high, ranging, as a rule, between a quarter and a fifth, the proportion being only 35.51 per cent for Russian (1894) railways, 27.71 per cent for Swiss (1894), 26.52 for Prussian (1896-97), 25.68 for Austrian, 25.29 for all German (1896-97) railways, 24.55 per cent for Belgian (State, 1895), 23.5 per cent for Danish (State, 1896-97), 21.20 for Norwegian (1895-'96), 20.59 for Swedish (State, 1895), 19.65 for Finnish (1895), and 18.97 per cent for the Imperial Alsace-Lorraine (1896-97) railways. The statistics of most of the Continental countries, moreover, show as often a decrease as an increase in the proportion of paying weight, and in the

\* See "*Der Personenverkehr auf den Eisenbahnen Sachsens im Jahre. 1893.*" *Archiv für Eisenbahnwesen.* 1896. Pp. 605-13. The dead weight in the first and second class on English and Continental railways, as in our parlor and sleeping car service, is even greater.

proportion of seats occupied to those unoccupied. The effect of the improved service, and especially of increased speed, is shown, moreover, in a diminution in the number of passengers per train,\* and in a decrease in the length and weight of the train itself.†

With this in mind, we may now seek to discover to what are due the great differences in the price of passenger transportation in various parts of the world. There have been many attempts made to explain these differences, and many more to deny their existence. If the claim is made that the Englishman or American pays a larger fare than the German or Belgian, the answer is immediately made that the service obtained for the higher is better than that obtained for the lower. But the first fact nevertheless remains unaltered, and stated baldly, it is this, that the German or Belgian pays less per mile of transportation than does the Englishman or American.‡

The rate of fares on Continental railways is considerably lower than on British and American lines. In 1896, the passenger on American railways paid an average of 2.019 cents for every mile that he was carried.§ In Great Britain the

\* According to Poor (1897), the average number of passengers per train on American railroads (that is, passenger-miles divided by passenger train miles) declined from 42.50 in 1884 to 35.67 in 1896.

† From 1886 to 1896, the number of carriages per passenger train on the Belgian state railways declined 16 per cent (from 8.86 to 7.45); the number of cars per freight train increased over 8 per cent (16.94 to 18.36).—*Royaume de Belgique, Chemins de fer, postes, télégraphes, téléphones et marine. Compte rendu des opérations pendant l'année 1896.* Brussels, 1897

‡ The usual comparisons of American and European fares do more credit to the ingenuity than to the ingenuousness of their authors. Our ordinary day coach service is compared with the first-class British or continental service, but whether the comparison is made upon the basis of an assumed equality in speed, safety, punctuality and comfort, or is due merely to the fact that both are called first-class, is conjectural. The animus of the writers has usually been to prove that we receive a greater or a smaller return for our money than do the citizens of other countries, but such a comparison can never be very exact. In the following comparison we will for the time being leave out of consideration the quality of the traffic and consider simply and solely its quantity. The fare per passenger-mile is obtained by dividing the passenger receipts by the total number of passenger-miles in all classes.

§ "Interstate Commerce Commission Report," 1896.



fares do not range much lower, and are probably not far from 2 cents per mile. The Continental fares, however, are in the main considerably lower. In Switzerland (1894) the average fare per mile was 1.54 cents, while that of the Gothard railway (1896) was a little over 2 cents (2.09). In Sweden (1895) the state railways charged 1.49 cents, and the private railways 1.54 cents, while the rate upon Norwegian (1895) roads was only 1.19 cents. In Holland (1895) the receipts per passenger-mile were 1.42 cents, in Roumania 1.33 cents, in France (1895) 1.21 cents, and in Germany (1896) 1.13 cents. The Prussian (1896) fares were particularly low, averaging 1.09 cents, as compared with 1.19 cents in Saxony (1896), and 1.27 cents in Bavaria (1895).\*

There are several countries, moreover, where the average passenger fare is less, and often considerably less, than a cent per mile. The Austrian state railways received 0.96 cent per passenger mile in 1896, and but 0.91 cent in 1895; on the Hungarian railways the receipts were 0.89 cent in 1896, and 0.82 cent in 1895; the Belgian state railways received only 0.95 cent in 1895, and the Russian (1894) roads but 0.72 cent. The cheapest traffic in the world, however, is probably to be found in India. On the broad-gauge railways, the average fare in 1895 was 0.42 cent per mile, and on the meter-gauge but 0.38 cent per mile.†

\*The "*Uebersichtliche Zusammenstellung der Wichtigsten Ausgaben der Deutschen Eisenbahnen-Statistik*," Berlin, 1898, gives the following rates per passenger-mile for the year 1896-97:

Railways.	Receipts per passenger-mile in cents.
Imperial Alsace-Lorraine . . . . .	1.21
Prussian State . . . . .	1.06
Bavarian State . . . . .	1.25
Saxon State . . . . .	1.18
Württemberg State . . . . .	1.16
Baden State . . . . .	1.21
Main-Neckar . . . . .	1.09
All German railways . . . . .	1.10

† These calculations have been made largely from the data furnished in the official reports, and where these were not obtainable from the excellent abstracts

It may thus be seen that the Indian travels five miles, the Russian three miles, and the Belgian, Austrian, Hungarian or Prussian two miles for the fare which we pay for one mile's travel. The discrepancy is a large one, and has been attributed to many causes. It has been supposed that the cheapness of fare will depend in the first place upon the density of population, and the cheap fares in such densely settled countries as India, Saxony and Belgium give support to the theory. Russia, Roumania and Norway, however, have lower fares than England or Switzerland, and while the density of the traffic undoubtedly does depend in large measure upon the density of population, there is no necessary connection between low fares and a thickly settled area.\*

High fares are often attributed, also, to the character of the service, and there is not unusually a causal sequence between the two. Within a country or railroad system, itself, variations in fare correspond to differences in the character of the service, and the difference in comfort between a second and a fourth-class compartment of a Prussian train is certainly sufficient to allow a considerably higher fare to be charged for the one than for the other. These superior accommodations, however, offered in the higher classes do not usually involve much additional cost, and extra charges are thus made for a service which is better, indeed, but not much

of the statistical reports furnished by the *Archiv für Eisenbahnwesen*. No attempt has been made to calculate the quota of passenger receipts that might be attributable to "free" baggage, and in some cases the above fare includes one hundred and fifty pounds of free baggage, in some thirty kilograms, and in others no free baggage at all. While in some unimportant respects, therefore, the receipts are not absolutely the same item, the results are for all practical purposes sufficiently exact.

\*Where there is an apparent connection between density of population and lowness of fares, as in the United States, the lowness of fares is usually traceable to density of traffic. The following table is interesting:

Density of Population. (Census of 1890.)	Passenger Den- sity (1896.)	Rate of Fare (1896.)
New England States . . . . . 76	15,254	1.84
South Atlantic States . . . . . 29	997	2.15
United States . . . . . 21.3	2,150	2.03

The fares and passenger density are taken from Poor's "Railroad Manual for 1897."

dearer in consequence. For example, the interest upon the original cost and the annual expenditure for wear and tear of a first-class passenger coach in Prussia would not justify an increase in the fare of a small fraction of a mill per mile over that of the third class; but while the average first-class fares are almost three times as high as those of the third class, it is probable that the high-class service is less remunerative than the lower. For every occupied seat in the third class carriage, there are three empty seats, whereas for every occupied seat in the first class carriages there are almost ten empty seats. The railroads receive, despite the great difference in the fares, only 0.34 cent per first class carriage seat per mile moved, as compared with 0.24 cent per mile for every seat in the third class carriages. The cost of carrying the first class passengers is high, not so much because the service is expensive, but because the cars are so poorly filled in consequence of the high fares. The influence of cost of service, though it has been unduly emphasized, cannot, of course, be totally disregarded, the elements of speed, frequency of trains, and station accommodations entering very largely into the consideration of cost. There is no doubt that a railroad with a very high grade of service can not reduce its fares to the level which they might attain were the service inferior or cheaper, but the question still remains whether the high grade of service causes the high fares, or conversely, the high fares produce the high grade of service. It is impossible to enter here into an historical account of the evolution of fares in England and America, but their history supports the theory that under private ownership of railways, fares tend to a monopoly price, and that the competition of railways does not tend permanently to reduce them, but merely to improve the service, and to increase the machinery for obtaining a larger bulk of the traffic. The competition of canals and waterways, the struggle of competing districts, the great mobility and susceptibility to

stimulation of freight, the large interests of the shippers and the wholesale character of the transmission of commodities all tend to reduce freight rates very rapidly, and the increasing economies in the utilization of the railroad facilities help to further this progress. These factors, however, are not so important in the case of the passenger traffic, and the tendency, therefore, is rather to maintain fares than to decrease them, and to suit the service to the fares rather than the fares to the service. The Continental countries could not pay the high fares that are charged on American roads, and a charge of even a cent a mile would be sufficiently exorbitant to debar the great majority of Indian travelers from the use of the road. There is, therefore, some truth in the theory occasionally advanced that passenger fares tend to vary with the varying ability of the average citizen in the different countries to pay them.

The previous discussion raises a series of interesting questions in regard to the future of the American passenger traffic, with which however it will be impossible to deal, save in the barest outline. The causes effecting a rapid reduction of freight charges have prevailed to a greater extent in the United States than perhaps in any other country. The excessive lowness of our freight rates has also been due to the cheap construction of our railways, the immense potentialities for traffic, the differentiation of industry within our borders and the protective policy, which while making our commerce interstate, rather than international, has localized industry to the advantage of the railroads. The long haul on American railways, due to these causes and to the extent of the country, has reduced the cost per ton-mile (by dwarfing terminal expenses), and at present freight is handled far more cheaply on American than on European roads. But the conditions above mentioned do not naturally result in a reduction of passenger fares, as of freight rates, and in fact the great distances between our centres of population, in so far as they act as a deterrent from travel, would naturally

result in high rather than in low fares. The high rate of wages and high standard of life prevailing in the United States make high passenger fares at present possible, but if our theory be correct, they do not promise lower fares in the future. If the railroads justify the higher fares of to-day by the ability of the people to pay them, why should they not justify still higher fares in the future by the increased ability of the people to pay them in the future? Why should not higher wages (if higher wages are to come in the future) be accompanied by increased passenger fares and correspondingly improved service?

It is somewhat difficult to understand how prices can rise though the cost of production fall, but as several of our economists have pointed out, there seems to be a certain tendency in this direction in retail transactions. In the passenger traffic, whether or not our present service *now* costs the railways more than the more primitive service of a half century ago cost them *then*, it is undoubtedly true that a much better service than that of the early fifties could now be reduplicated at a much lower cost than at that period. While in many parts of the country fares have decreased considerably, it seems that passenger fares in Massachusetts are actually higher to-day than they were half a century ago. The service has indeed improved very greatly during this period, but the railways have as yet resisted the demand for much lower fares, even with inferior accommodations.

While, however, the tendencies that have been active during the last few decades would not encourage us in a belief of a future lowering of passenger fares, and while this would be dearly purchased, if there were an inseparable connection between high wages and high fares, there are at present certain indications of coming reductions in our passenger charges. The demand for cheaper travel is growing stronger, and is expressing itself in more definite form, while at the same time the railways are getting in a position where fares may be reduced without a general rate war.

Moreover a new instrument has been introduced by means of which passenger traffic may be revolutionized. The application of electricity to railroads (whatever its drawbacks) allows a more complete utilization of rolling stock than is ordinarily possible with steam, and the construction of cheap electric lines, especially intended to serve short distance passenger traffic, will compel an increase of that traffic that can only be accomplished by a radical reduction of fares. Where a railway is almost entirely dependent upon its passenger traffic, it can not perhaps afford to carry passengers at the low rate at which a railroad with a lucrative freight traffic could *possibly* carry them, but the natural tendency will nevertheless be for its fares to be lower than those of the other road, since in order to exist it must have a large traffic, and the greater the number of passengers required to make a road profitable, the smaller must be the fare charged. It seems therefore quite within the bounds of probability that the electric, suburban and inter-urban railways will cause a reduction, which may react upon all other fares.

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